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Long-term variations in the parameters of the midlatitude sporadic E layer and their regional variability

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Abstract

Significant trends of the considered frequency parameters of the Es layer have been revealed based on the performed analysis of the long-term variations in foEs,fbEs, and the range of semi-transparency of the sporadic E layer for 22 midlatitude stations in the Northern Hemisphere. The positive and negative trends in the seasonal mean parameters of fbEs and in the semi-transparency range, respectively, prevail at all considered stations. The regional variability in the trend sign of the seasonal mean values of foEs has been found out: the negative and positive trends of foEs values prevail in Russia and in Western Europe. The trends in nighttime values of the Es-layer frequency parameters mainly exceed the trends in the daytime values, but no systematic differences in the trends values for various seasons are found.